was complete infarction of the renal cortex and medullary papillae bilaterally. There was some preservation of blood supply to the pelvic structures.

The patient had an uneventful postoperative course. He is currently being maintained on an outpatient chronic hemodialysis program awaiting renal transplantation.

Discussion

The mechanism of injury in bilateral renal artery thrombosis following blunt trauma is unknown. It has been postulated that it is related to the stretching of the renal vascular pedicle, rupture of the arterial intima and subsequent dissection with hematoma formation.[6] Intimal disruption was noted in the present case. It is an impressive coincidence that the reported cases have all involved persons in their late teens. However, whether or not age is a predisposing factor in the pathogenesis of the thrombosis rather than rupture of the renal pedicle is only speculative.

The maximum time of total renal ischemia *in vivo* which, when reversed, will result in restoration of significant renal function is not clearly established. Experiments on ischemic rat kidneys suggest that irreversible changes occur after clamps have been applied more than two hours.[7] In human renal transplantation experience, warm ischemia time of more than two hours is almost invariably associated with a non-viable kidney.

It is quite possible in some cases that complete occlusion of the renal arteries does not occur immediately following trauma. In one reported case the aortogram three days following injury showed "a high grade stenosis" of both renal arteries.[3] Where occlusion has been complete, arterial reconstruction at 18 hours has resulted in restoration of 50% renal function.[4] In the present case, a similar operation performed at 26 hours after trauma restored no appreciable renal function.

Because of the probability of severe hypertension as a late consequence and because surgical removal of the kidneys at a late date would be technically more difficult, we elected to do a bilateral nephrectomy early. Among the reported cases the one patient who did not undergo bilateral nephrectomy died as a direct result of the complications of hypertension.[2]

Although bilateral renal artery thrombosis is an apparently rare occurrence it should be considered in the differential diagnosis in any patient who presents with hematuria and/or anuria following blunt trauma, particularly if the patient is young and there has been no clear-cut evidence of shock. If the integrity of the collecting system has been established and intravenous pyelography fails to visualize the kidneys, emergency aortography is mandatory. If bilateral renal artery thrombosis is demonstrated, immediate surgical intervention is indicated. Viability of the kidneys should be determined by biopsy with frozen section and/or perfusion procedures similar to those used in renal transplantation. If either kidney is viable then reconstructive surgery should be undertaken. If it is determined that the kidneys are nonviable, then bilateral nephrectomy should be performed.

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Nuchal infiltrations ...as an office procedure

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The most common ailment that man is heir to is head pain. One may speculate why this is so, but that it is true is undeniable. The structure that we have above our shoulders contains not only sense organs important to man but also his master organ, and therefore it is no surprise that his attention is focused on it.

In my neurological practice I was impressed by the number of patients referred by their physicians because of headaches. This led to a review of charts of all patients seen over an 18-month period. There were 532 referred patients, 24.6% of the entire group, whose primary complaint was headaches. In 61% the headaches were a direct result of contraction of muscles of the head and neck due to emotional tension; in another 3% cervical disease was giving rise to secondary muscle contraction; and in 7% the pain was due to muscle contraction and superimposed vascular components, and designated tension vascular headache. In the other 29% the origin of the pain was not neck muscle contraction; these cases will not be discussed.

Almost all patients with headache due to contraction of muscles of the head and neck had tenderness to light pressure at the base of the skull, either at the origin of the trapezius muscles or at the midpoint between midline and mastoid process, that is, roughly over the course of the greater occipital nerve and occipital artery. Also very rarely there is tenderness at the site of insertion of the sternomastoid muscle.

In all cases the neurological examination was otherwise negative except for signs of emotional tension. Most patients admitted on inquiry to various symptoms of anxiety.

Another group of patients with the same physical and emotional findings consists of those who have sustained trauma to the neck area, usually as a result of a tail-gate collision. It has long been wondered why patients with a pure cervical sprain have pains and aches in their foreheads, temples, eyes, cheeks or maxillary teeth.

Kerr, working at the Mayo Clinic, has explained this phenomenon as follows: The spinal tract of the trigeminal nerve descends from the trigeminal nucleus in the mid pons into the cervical cord to approximately the C4 level. The nuchal muscles are largely supplied by the C2-3 nerves; sensory impulses originating in these muscles are poured into the cervical cord where, it is postulated, some are carried by fibres of the trigeminal tract and are therefore interpreted by the brain as coming from the area innervated by the trigeminal nerve. Kerr is basically describing simple referred pain.

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Why should anxiety cause nuchal muscle spasms and pain which can become intractable? The following is the author's explanation. No claim is made for its originality. If anxiety is due to unconscious fear, which is the accepted psychiatric explanation, then perhaps all one has to do is to observe the reaction of a wild animal to a threat — its head pops up into the air by contraction of the posterior cervical muscles. It is suggested that our unconscious fear causes a similar involuntary muscular reaction.

A further mechanism is involved, namely involuntary guarding by muscular contraction when pain occurs. The painful area is not permitted to move and a vicious cycle is created of spasm and pain.

About a decade ago I began to wonder what more could be done for people with intractable headache due to such muscle contraction. Caffeine-containing beverages were limited to three or four cups a day. Local physiotherapy was instituted with heat, massage and exercises that the patient could do at home frequently every day. Anti-anxiety agents were prescribed, especially diazepam because of its efficacy and few side effects. However, even with such measures many patients continued to have headaches. From a survey made at five years' follow-up, I learned I had only been able to help one third of these patients.

It was then I began injecting muscles at the base of the skull, at first with lidocaine and then with a mixture of lidocaine and a steroid, using either methylprednisolone acetate, 40 mg., or dexamethasone-t-butylacetate, 4 mg., with 4 ml. of 2% lidocaine without epinephrine. Fig. 1 illustrates the area so treated. The tissues are infiltrated in a fan-wise fashion from the periosteum to the subcutaneous tissue. It is a simple office procedure and has no side effects save, perhaps, a little wooziness for 20 minutes following an injection. It must be relatively painless since many patients return to have it repeated. During the infiltration, if one hits the area that is causing referred pain, the patient will frequently say that he feels discomfort in the temple, the eye, or the teeth. This seems to confirm Kerr's theory. I have performed the procedure several hundred times without any problems except on one occasion when the needle broke into a very shallow mastoid air cell; the patient was dizzy for eight hours, but there were no permanent sequelae, and his headache did, indeed, improve. One must avoid the foramen magnum but it is difficult to enter. (A cisternal puncture is almost always performed by design and not by accident.)

There are patients who do not respond to this or any other treatment, but in the author's hands it has proved helpful, and may break temporarily the vicious cycle of pain and spasm. However it is always used as a last resort, when all else has failed.

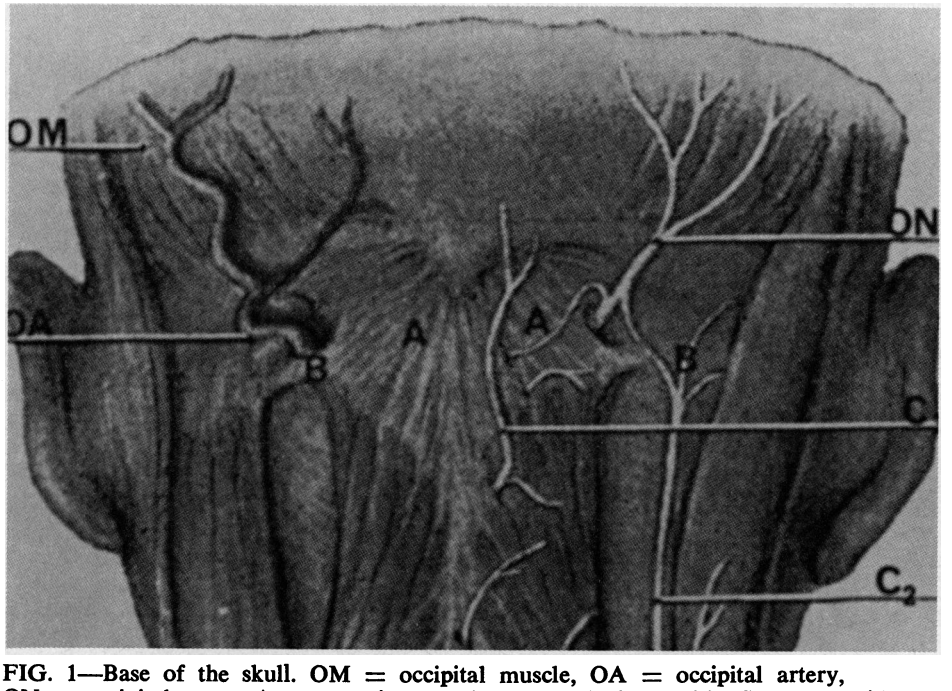

FIG. 1—Base of the skull. OM = occipital muscle, OA = occipital artery, ON = occipital nerve, A = trapezius muscle, B = splenius capitis. Sternomastoid muscles are seen at the lateral borders. C2 = posterior primary ramus of second cervical nerve, C3 = posterior primary ramus of third cervical nerve. A and B also indicate the points at which the needle is inserted to perform the infiltration as described in text.